

Math 408: Mathematical Statistics

Everything can change with little or no notice at any moment...

In particular, a class (lecture and/or discussion) can be moved to on-line mode on a very short notice, so please check your e-mail before every class.

Mathematical Statistics (Math 408)

Spring 2024

Class number 39635R

(11am MWF, LVL 16)

The final exam is Wednesday, May 1, 11am–1pm, in LVL 16

Our Math 408 in Spring 2024 semester: Key dates

- January 8: first day of classes
- January 15: MLK Day, no class
- January 26: Last day to drop without a 'W' AND with refund
- February 19: Presidents' Day, no class
- February 23: Last day to drop without a 'W', BUT WITH NO refund
- March 4: Midterm Exam 1 (during regular lecture time, in the regular lecture room)
- March 8: First computer project is due
- March 11-15: Spring break
- April 5: Last day to drop with a 'W'
- April 15: Midterm Exam 2 (during regular lecture time, in the regular lecture room)
- April 19: Second computer project is due
- April 26: Experimental project is due; Last day of classes
- May 1: Final exam (11am-1pm, in the regular lecture room LVL 16)

[Class Schedule](#)

[Homeworks and the Experimental Project](#)

[Computer Projects](#)

- **Instructor:** [Dr. Sergey Lototsky](#).
Office: KAP 248 D.
Phone: (213) 740-2389.
E-mail: lototsky (at) usc (dot) edu.

Lectures: MWF 11:00-11:50am, LVL 16 [”basement” of the Leavey Library]
Office hours: MWF 12:30-1:30pm [in-person/on zoom]

Please make sure to talk to me about your problems, questions, or concerns in this class. We can always arrange a special zoom meeting.

- **Teaching Assistant:** Bixing Qiao

E-mail: bqiao [at] usc (dot) edu

Discussions: T Th, 8:00-8:50am and 9:00-9:50am in DMC 252, starting January 9.

Office hours: W 10-11am, F noon-2pm

- **Textbook:** “Mathematical Statistics with Applications” by D. Wackerly, W. Mendenhall and R. Scheaffer, published by CENGAGE Learning of Brooks/Cole. Any edition will do; I have 7th (from 2007/2008).
- **Objective:** To provide the students with the general knowledge and skills necessary to apply statistical methods to more specific areas of natural and social sciences.
- **Goal:** To understand the material in Chapters 1 and 8-16 of the book.
- **Note:** The material of Chapters 2-7 in our book is covered in MATH 407 and is a pre-req for this class [MATH 407 uses a different book, though].

There will be two one-hour exams: March 4 and April 15 (both Mondays) during regular lecture hours. Final exam is Wednesday, May 1, 11am-1pm, in LVL 16.

Calculators are **required** during exams and most quizzes.

Homework, Quizzes, etc.: There will be 12 weekly quizzes, 12 homeworks, two computer projects, and an experimental project. You should know how to solve every homework problem and turn in each homework on the corresponding due date, but do not expect homework problems to be thoroughly graded. You are welcome to use any help with all the work other than quizzes and exams. During quizzes and exams, you are on your own, with only a writing/erasing instrument, a calculator (without internet connection or any other communication capabilities) and, if applicable, suitable tables of basic distributions. The choice of a calculator is up to you. In particular, you are welcome to use one with advanced statistical features, so that you will not need any tables. While a precise definition of a calculator might not really exist, devices such as tablets, smart phones, and laptop computers certainly do not count as calculators and are not allowed during exams. If in doubt, please talk to me in advance about the particular calculator you plan to use.

Please keep in mind that homework assignments are minimal requirements. To succeed in the class, you need to solve more problems, from the book and/or from other sources. **Keep all your notes, including scratch paper, until after you are completely done with this class.**

Quizzes will take place during discussion sections, either on Tuesday or on Thursday. The exact dates are in the class schedule. Calculators are required for most quizzes. **The teaching assistant is responsible for preparing, administering, and grading quizzes and for collecting and grading the homeworks.**

Grading:

- Quizzes 10% total (less than 1% each)
- Homeworks 10% total (less than 1% each)
- Two One-Hour Exams, 30% total (15% each)
- Two Computer Projects, 10% total (5% each)
- Experimental Project 10%
- Final Exam 30%

Approximate Grading Scheme. A: 90 and up; B: 80-89; C: 70-79. Pluses/minuses (As in A-, B+, etc.) will mostly be decided on a case-by-case basis.

Missed work. The general rule: no make-up exams or quizzes, and no late submissions of homeworks or projects (but early submissions, especially in electronic format, are welcome).

Emergencies will be handled on a case-by-case basis. If you miss the final exam, with a valid excuse, you get an incomplete in the class; an incomplete is a major inconvenience for a number of people, including yourself, so, please, do not miss the final.

To encourage and reward consistent performance throughout the semester, I will not automatically drop any scores (such as the two lowest quizzes, etc.)

Additional Information.

Students Requiring Special Accommodation

Any student requesting academic accommodations based on special needs is required to register with OSAS (Office of Student Accessibility Services) each semester. A letter of verification for approved accommodations can be obtained from OSAS. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. OSAS is located in GFS 120. To contact OSAS: (213) 740-0776 [tel.], SASfrntd@usc.edu [e-mail], [on the web](#).

Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Scampus (the Student Guidebook) contains the Student Conduct Code in Section 11.00, while the recommended sanctions are in Appendix A.

Academic Support [The Kortschak Center for Learning and Creativity](#)

Additional Material

Previous exams

Exam 1 [Spring 2015](#) [Spring 2016](#) [Fall 2017](#) [Spring 2018](#) [Fall 2020](#) [Spring 2022](#)
[\[sol\]](#) [Spring 2023](#) [Spring 2024](#)

Exam 2 [Spring 2015](#) [Spring 2016](#) [Fall 2017](#) [Spring 2018](#) [Fall 2020](#) [Spring 2022](#) [Spring 2023](#) [Spring 2024](#)

Final Exam [Spring 2015](#) [Spring 2016](#) [Fall 2017](#) [Spring 2018](#) [Fall 2020](#) [Spring 2022](#) [Spring 2023](#)

Other materials

- **Mine**
 - [Some Abbreviations](#)
 - [Lecture 1](#)
 - [General summary of probability](#)
 - Random variables: [general definitions](#) and an [easy diagram](#)
 - [Summary of normal distribution and CLT](#) [and a [more detailed version](#)]
 - [Basic inequalities](#)
 - [Convergence of random variables](#) and an [illustration](#)
 - [Summary of some confidence intervals](#)
 - [Summary of some hypothesis testing](#)
 - Two summaries of linear algebra: [somewhat basic](#) and [more advanced](#)
 - [Summary of ANOVA](#)
 - [Thomas Bayes](#)
 - [Gamma and Beta Functions](#)

- **By other people**
 - [\(Almost\) everything you need to know about probability distributions](#)
 - [Basic formulas and tables](#)
 - [Four tables](#) [can be used on all our exams]
 - Two summaries of linear algebra: your choice of [Four pages](#) or [Ten pages](#)
 - [Cauchy distribution](#)
 - [How to write Greek letters](#) (by Olga Korosteleva, CSULB)
 - [Simpson's Paradox](#)
 - [Normal Probability Plot](#)
 - [More about probability plots](#)
 - [Quantile-Quantile plot](#)
 - [Non-uniqueness of MLE](#)
 - [A research paper about sample correlation coefficient](#)
 - [A research paper about variance stabilization](#)
 - [An essay on \(recent\) history of statistics](#)
 - [A survey paper about conjugate priors](#)
 - The German Tank Problem: a [Wiki summary](#), a [student research paper](#)
 - [Size-biasing](#) [a survey paper by USC Math Professors]
 - [An example of a dataset](#)

Part of [this](#) is performed by a (then, future, now, former) math 408 student

More

- [On handwriting](#)
- [What makes an expert?](#) Also [from our book](#).
- [No optional material](#)

[Southern California Chapter of the American Statistical Association \(SCASA\)](#)

[Minor in Statistics at USC](#)

USC Math Department [Homepage](#)